SAR Test Report

Report No.: AGC05041150804FH01

FCC ID	:	EW780-0210-01
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Wireless monitoring System with Safe & Sound Digital Audio Monitor - Parent Unit
BRAND NAME	:	vtech
MODEL NAME	:	DM251-102 PU, DM251 PU, DM25x-abcd PU
CLIENT	:	VTech Telecommunications Ltd.
DATE OF ISSUE	:	Sep. 6,2015
STANDARD(S)	:	IEEE Std. 1528:2013;IEEE Std. 1528a:2005 FCC 47CFR § 2.1093;IEEE/ANSI C95.1:1992
REPORT VERSION	:	V1.0

Attestation of Global Compliance(Shenzhen) Co., Ltd.

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Sep. 6,2015	Valid	Original Report

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Test Report Certification

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Applicant Address :	23/F, Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po, Hong Kong
Manufacturer Name :	VTech Telecommunications Ltd
Manufacturer Address :	23/F, Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po, Hong Kong
Product Designation :	Wireless monitoring System with Safe & Sound Digital Audio Monitor - Parent Unit
Brand Name :	vtech
Model Name :	DM251-102 PU, DM251 PU, DM25x-abcd PU
Different Description	See Page 7, The test model is DM251-102 PU.
EUT Voltage :	DC2.4V by battery
Applicable Standard :	IEEE Std. 1528:2013;IEEE Std. 1528a:2005 FCC 47CFR § 2.1093;IEEE/ANSI C95.1:1992
Test Date :	Aug. 28,2015
Performed Location	Attestation of Global Compliance(Shenzhen) Co., Ltd. 2 F, Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen, China
Report Template	AGCRT-US-2.4G/SAR (2015-05-01)

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1. SUMMARY OF MAXIMUM SAR VALUE

The maximum results of Specific Absorption Rate (SAR) found during testing for EUT are as follows:

Highest Reported SAR ：

Exposure Position	Frequency Band(MHz)	Highest Reported 1g-SAR(W/Kg)
Body	1924.992	**<0.0015**

This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/Kg) specified in IEEE Std. 1528:2013; IEEE1528a-2005;FCC47CFR § 2.1093; IEEE/ANSI C95.1 and the following specific FCC Test Procedures:

- KDB 447498 D01 General RF Exposure Guidance v05r02
- KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04

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2. GENERAL INFORMATION

2.1. EUT Description

General Information	
Product Designation	Wireless monitoring System with Safe & Sound Digital Audio Monitor - Parent Unit
Test Model	DM251-102 PU
Hardware Version	35-200527-X0X-10A
Software Version	N/A
Device Category	Portable
RF Exposure Environment	Uncontrolled
Antenna Type	Internal
DECT Band	
Frequency Range	1900: 1920-1929MHz
Type of modulation	GFSK
Antenna Gain	0dBi
Max. Peak Power	19.2dBm
Accessories	
Battery One	Brand name: GPI Model No. : BT186692 Voltage and Capacitance:2.4V 750mAh
Adapter	Model No: N/A Brand name. : N/A Input: N/A Output: N/A

Product	Type	
	☒ Production unit	☐ Identical Prototype

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vtech

VTech Telecommunications Ltd

Aug 17, 2015

To whom it may concern,

Multiple Models Confirmation Letter

I, the undersigned, hereby confirm that the family models are listed in the following table.

These models are identical as follows:

- ☒ Electronics/electrical designs, including software & firmware
- ☒ Construction design/Physical design/Enclosure
- ☒ PCB layout
- ☐ (Others, please specify)_____

The only differences between these models are the follows for marketing purpose:

- ☒ Color
- ☐ Cosmetic details
- ☐ Trade name
- ☒ Model Number
- ☐ (Others, please specify)

☒ Suffix ("x, a, b, c, d") represents
- ☐ Color code
- ☒ Packing configuration
- ☒ Others, please specify)
  x=any alphanumeric character is presenting different type packaging.
  a=any alphanumeric character or blank is presenting number of parent unit.
  bc=any number or blank is presenting combination of sensor type in the bundle
  d = any alphanumeric character or blank is presenting color options or packaging.

For the product subject to authorization under FCC Declaration of Conformity:
In addition, it is to confirm that all the below information
1) the U.S. responsible party,
2) FCC label artworks and location,
3) FCC required statement in the user manual
are the same but different in the following model numbers only:

Item No.	New model	Model Number	Trade Name	Remarks
1	☒YES	DM251 PU	vtech	1PU
2	☒YES	DM251-102 PU	vtech	1PU
3	☒YES	DM25x-abcd PU	vtech	a PU

The sample being submitted to Intertek Testing Services for conformity assessment is DM251-102 PU (test model) of the above list.

Regards,

Michael Tsui
Approbation Supervisor

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2.2. Test Procedure

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	EUT Communicate with CMD60/RTX2012, and test them respectively at DECT bands

2.3. Test Environment

Ambient conditions in the laboratory:

Items	Required	Actual
Temperature (°C)	18-25	21± 2
Humidity (%RH)	30-70	55±2

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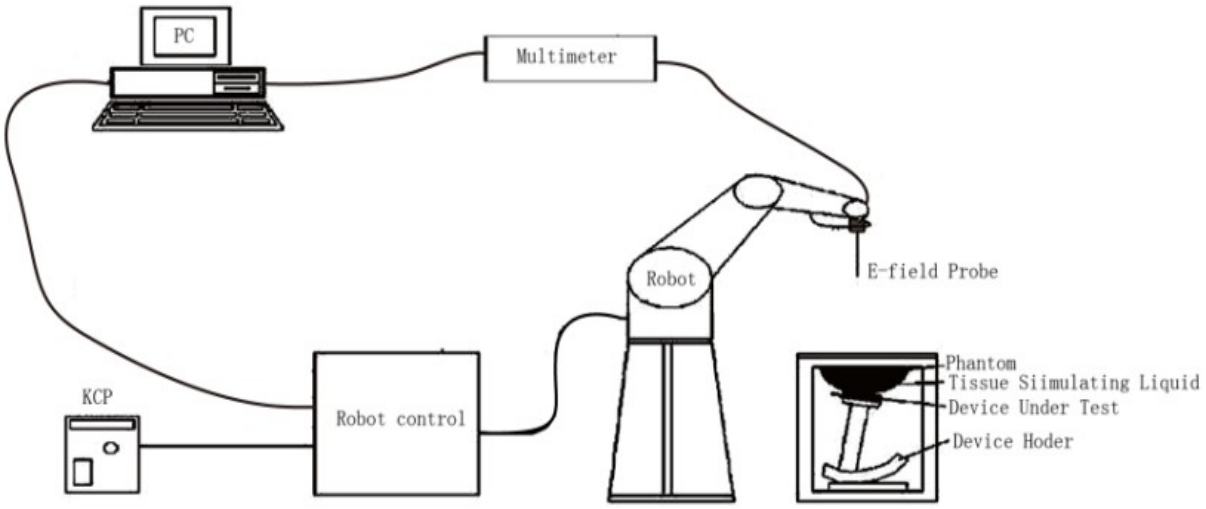
3. SAR MEASUREMENT SYSTEM

3.1. SATIMO System Description



The COMOSAR system for performing compliance tests consists of the following items:

- The PC. It controls most of the bench devices and stores measurement data. A computer running WinXP and the Opensar software
- The E-Field probe. The probe is a 3-axis system made of 3 distinct dipoles. Each dipole returns a voltage in function of the ambient electric field.
- The Keithley multimeter measures each probe dipole voltages.
- The SAM phantom simulates a human head. The measurement of the electric field is made inside the phantom.
- The liquids simulate the dielectric properties of the human head tissues.
- The network emulator controls the mobile phone under test.
- The validation dipoles are used to measure a reference SAR. They are used to periodically check the bench to make sure that there is no drift of the system characteristics over time.
- The phantom, the device holder and other accessories according to the targeted measurement.
- The lower SAR detection threshoid of the system is 0.0015 W/Kg.

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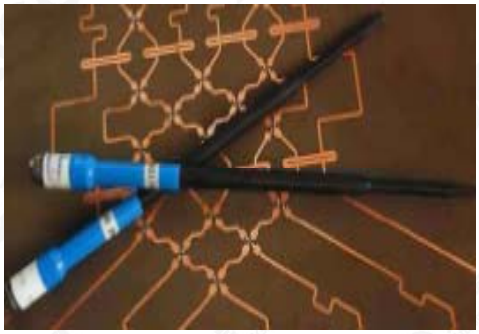
3.2. COMOSAR E-Field Probe

The SAR measurement is conducted with the dissymmetric probe manufactured by SATIMO. The probe is specially designed and calibrated for use in liquid with high permittivity. The dissymmetric probe has special calibration in liquid at different frequency. SATIMO conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528-203 and relevant KDB files) Under ISO17025. The calibration data are in Appendix D.

Isotropic E-Field Probe Specification

Model	SSE5	
Manufacture	SATIMO	
Frequency	0.3GHz-3GHz Linearity:±0.09dB(300MHz-3GHz)	
Dynamic Range	0.01W/Kg-100W/Kg Linearity:±0.09dB	
Dimensions	Overall length:330mm Length of individual dipoles:4.5mm Maximum external diameter:8mm Probe Tip external diameter:5mm Distance between dipoles/ probe extremity:2.7mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 3 GHz with precision of better 30%.	

3.3. Robot

The COMOSAR system uses the KUKA robot from SATIMO SA (France).For the 6-axis controller COMOSAR system, the KUKA robot controller version from SATIMO is used. The XL robot series have many features that are important for our application: High precision (repeatability 0.02 mm) High reliability (industrial design) Jerk-free straight movements Low ELF interference (the closed metallic construction shields against motor control fields) 6-axis controller	

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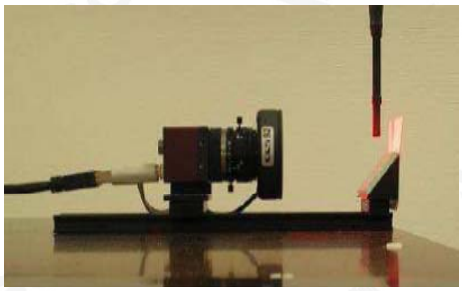
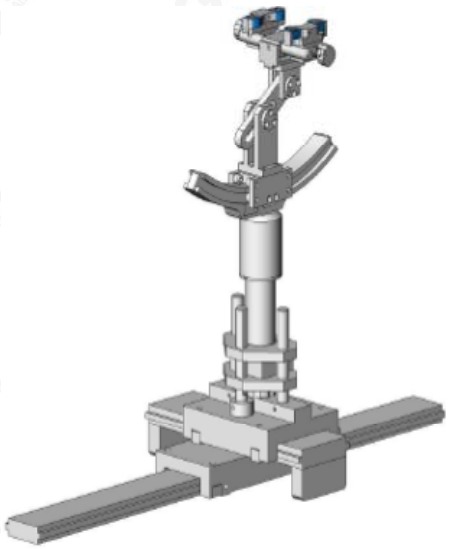
3.4. Video Positioning System

The video positioning system is used in OpenSAR to check the probe. Which is composed of a camera, LED, mirror and mechanical parts.The camera is piloted by the main computer with firewire link.
During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.
The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.



3.5. Device Holder

The COMOSAR device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).
Thus the device needs no repositioning when changing the angles.
The COMOSAR device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity εr =3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



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3.6. SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas: Left head Right head Flat phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

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4. SAR MEASUREMENT PROCEDURE

4.1. Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and occupational/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element(dv) of given mass density (ρ). The equation description is as below:

$$\mathrm{SAR} = \frac{\mathrm{d}}{\mathrm{d}t}\left(\frac{\mathrm{d}W}{\mathrm{d}m}\right) = \frac{\mathrm{d}}{\mathrm{d}t}\left(\frac{\mathrm{d}W}{\rho \mathrm{d}V}\right)$$

SAR is expressed in units of Watts per kilogram (W/Kg)
SAR can be obtained using either of the following equations:

$$\mathrm{SAR} = \frac{\sigma E^2}{\rho}$$

$$\mathrm{SAR} = c_h \left.\frac{\mathrm{d}T}{\mathrm{d}t}\right|_{t=0}$$

Where

SAR	is the specific absorption rate in watts per kilogram;
E	is the r.m.s. value of the electric field strength in the tissue in volts per meter;
σ	is the conductivity of the tissue in siemens per metre;
ρ	is the density of the tissue in kilograms per cubic metre;
c_h	is the heat capacity of the tissue in joules per kilogram and Kelvin;
$\frac{\mathrm{dT}}{\mathrm{dt}} \mid \mathrm{t} = 0$	is the initial time derivative of temperature in the tissue in kelvins per second

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4.2. SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface is 2.7mm This distance cannot be smaller than the distance os sensor calibration points to probe tip as `defined in the probe properties,

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in SATIMO software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in db) is specified in the standards for compliance testing. For example, a 2db range is required in IEEE Standard 1528 and IEC62209 standards, whereby 3db is a requirement when compliance is assessed in accordance with the ARIB standard (Japan) If one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximum are detected, the number of Zoom Scan has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100MHz to 6GHz

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

Zoom Scan are used to assess the peak spatial SAR value within a cubic average volume containing 1g abd 10g of simulated tissue. The Zoom Scan measures points(refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1g and 10g and displays these values next to the job's label.

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Zoom Scan Parameters extracted from KDB865664 d01 SAR Measurement 100MHz to 6GHz

Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power Drift Measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the same settings. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

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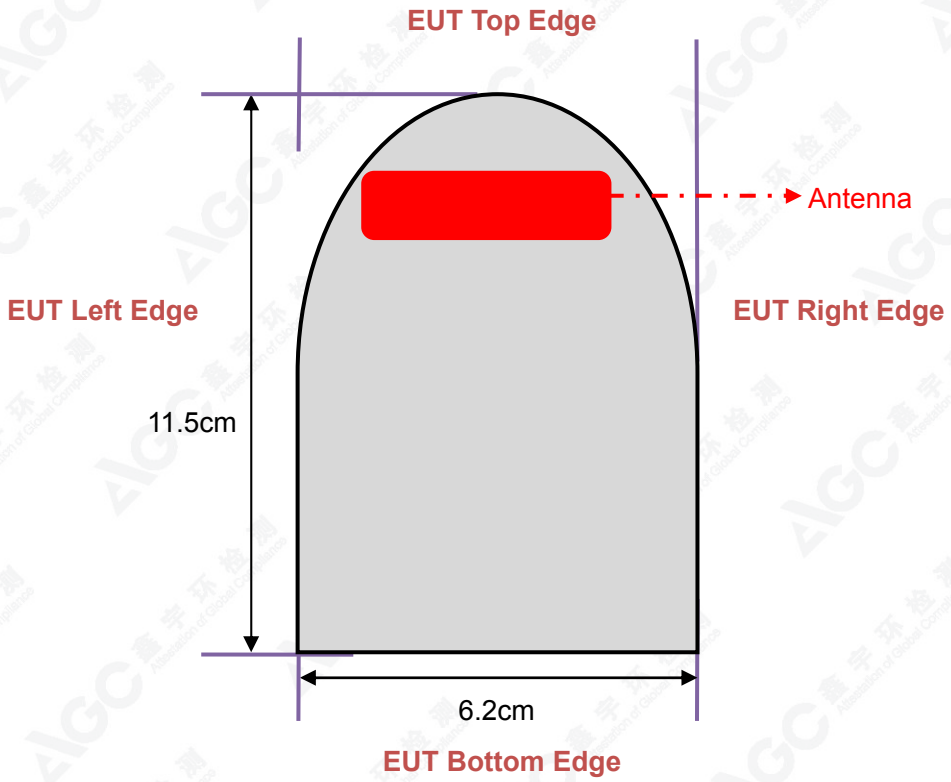
4.3. RF Exposure Conditions

Test Configuration and setting:

The EUT is a model of DECT. For DECT SAR testing, the device was controlled by software.

The distance between the EUT and the antenna is larger than 50cm, and the output power radiated from the antenna is at least 30db smaller than the output power of EUT.

Antenna Location: (back view)



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5. TISSUE SIMULATING LIQUID

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15cm. For head SAR testing the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15cm For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm.The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in 4.2

5.1. The composition of the tissue simulating liquid(% Weight)

Ingredient	1900MHz	1900MHz
(% Weight)	Head	Body
Water	54.9	40.4
Salt	0.18	0.5
Sugar	0.0	58.0
HEC	0.0	1.0
Bactericide	0.0	0.1
DGBE	44.92	0.0

5.2. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in IEEE 1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in IEEE 1528.

Target Frequency (MHz)	**head**		**body**	
	εr	**σ (S/m)**	**εr**	**σ (S/m)**
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	1.01	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800–2000	**40.0**	**1.40**	**53.3**	**1.52**
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m3)

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5.3. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using SATIMO Dielectric Probe Kit and R&S Network Analyzer ZVL6.

Tissue Stimulant Measurement for 1900MHz					
Head	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr40.00(38.00-42.00)	δ[s/m]1.40(1.33-1.47)		
	1900	40.00	1.37	22.0	Aug. 28,2015
	1925	39.36	1.40		Aug. 28,2015

Tissue Stimulant Measurement for 1900MHz					
Body	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr 53.30 50.635-55.965	δ[s/m] 1.52 1.444-1.596		
	1900	54.15	1.50	21.8	Aug. 28,2015
	1925	53.76	1.51		Aug. 28,2015

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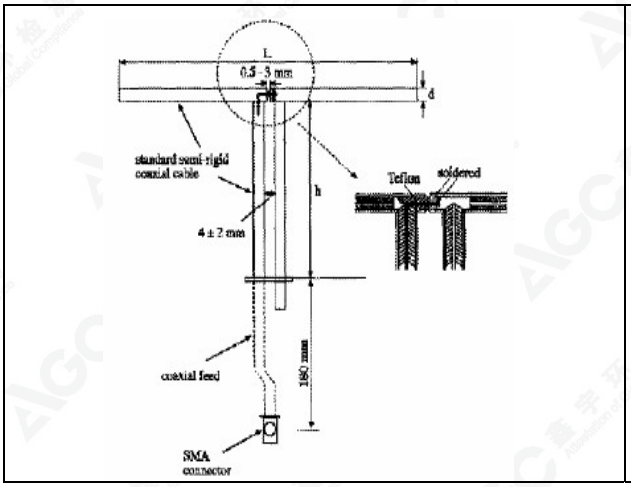
6. SAR SYSTEM CHECK&VALIDATION PROCEDURE

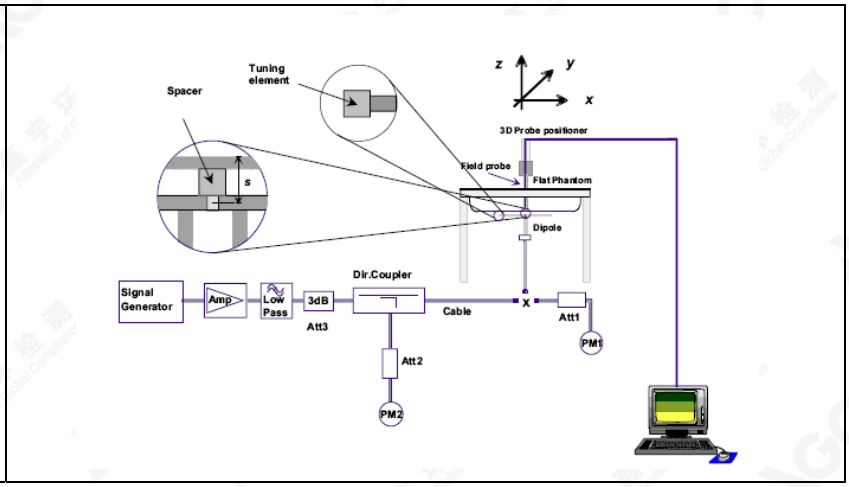
6.1. SAR System Check Procedures

SAR system check is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

Each SATIMO system is equipped with one or more system check kits. These units, together with the predefined measurement procedures within the SATIMO software, enable the user to conduct the system check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system check setup is shown as below.





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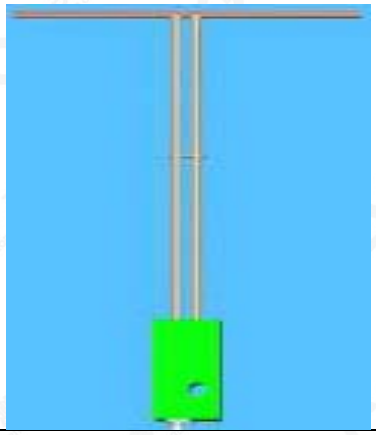
6.2. SAR System Check

6.2.1. Dipoles

	The dipoles used is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of both IEEE and FCC Supplement C. the table below provides details for the mechanical and electrical Specifications for the dipoles.

Frequency	L (mm)	h (mm)	d (mm)
1900MHz	68	39.5	3.6

6.2.2. System Check Result

System Performance Check at 1900MHz										
Validation Kit: SN 46/11DIP 1G900-187										
Freq. [MHz]	Target Value(W/Kg)		Reference Result (± 10%)		Tested SAR Value(W/Kg) Input Power=18dBm		Normalized to 1 W/Kg		Tissue Temp. [°C]	Test time
	1g	10g	1g	10g	1g	10g	1g	10g		
1900 Head	39.65	20.24	35.685-43.615	18.216-22.264	2.325	1.182	36.849	18.733	21.6	Aug. 28,2015
1900 Body	40.74	21.43	36.666-44.814	19.287-23.573	2.588	1.290	41.017	20.445	21.5	Aug. 28,2015

Note:

(1) We use a CW signal of 18dBm for system check, and then all SAR value are normalized to 1W forward power. The result must be within ±10% of target value.

(2) Tested normalized SAR (W/kg) = Tested SAR (W/kg) ×[1000/ 10^1.8]

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6.3. SAR System Validation

The SAR measurement system was validated according to procedures in KDB 865664 D01.
SAR probe and tissue dielectric parameters are as shown bellow.

Test Data	Probe S/N	Tested Freq. (MHz)	Tissue Type	Cond.	Perm	CW validation			Mod. validation		
						Sensitivity	Probe Linearity	Probe Isotropy	Mod. Type	Duty Factor	Peak to average power ratio
14/05/2015	SN 22/12 EP159	1900	head	39.55	1.41	PASS	PASS	PASS	GFSK	PASS	N/A
12/06/2015	SN 22/12 EP159	1900	body	53.0	1.49	PASS	PASS	PASS	GFSK	PASS	N/A

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7. EUT TEST POSITION

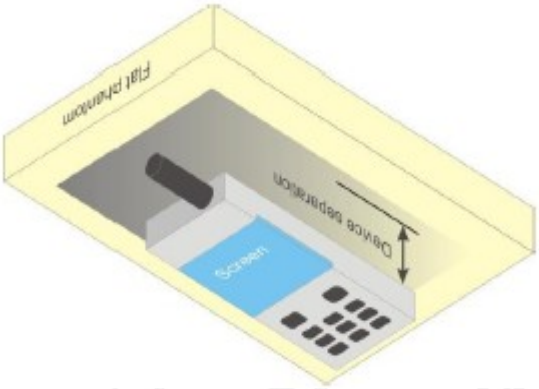
This EUT was tested in **Body back, Body front and face up.**

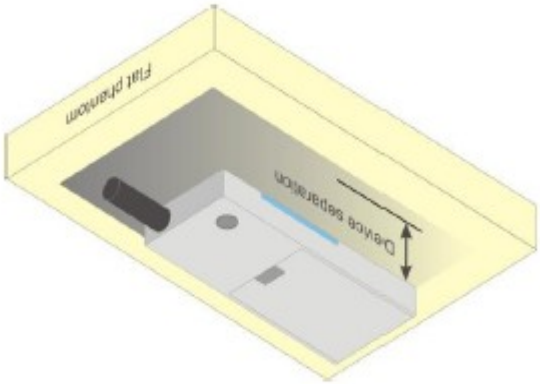
7.1. Body Worn Position

(1) To position the EUT parallel to the phantom surface.

(2) To adjust the EUT parallel to the flat phantom.

(3) To adjust the distance between the EUT surface and the flat phantom to **0mm for body back touch and body front with 0mm& face up with 25mm separation.**





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8. SAR EXPOSURE LIMITS

SAR assessments have been made in line with the requirements of IEEE-1528, and comply with ANSI/IEEE C95.1-1992 “Uncontrolled Environments” limits. These limits apply to a location which is deemed as “Uncontrolled Environment” which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

Limits for General Population/Uncontrolled Exposure (W/kg)

Type Exposure	Uncontrolled Environment Limit (W/kg)
Spatial Peak SAR (1g cube tissue for brain or body)	1.60
Spatial Average SAR (Whole body)	0.08
Spatial Peak SAR (Limbs)	4.0

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9. TEST EQUIPMENT LIST

Equipment description	Manufacturer/ Model	Identification No.	Current calibration date	Next calibration date
SAR Probe	SATIMO	SN 22/12 EP159	12/03/2014	12/02/2015
TISSUE Probe	SATIMO	SN 45/11 OCPG45	12/03/2014	12/02/2015
Phantom	SATIMO	SN_4511_SAM90	Validated. No cal required.	Validated. No cal required.
Liquid	SATIMO	-	Validated. No cal required.	Validated. No cal required.
Comm Tester	R&S - CMU200	069Y7-158-13-712	03/06/2015	03/05/2016
Comm Tester	Agilent-8960	GB46310822	03/06/2015	03/05/2016
Multimeter	Keithley 2000	1188656	03/06/2015	03/05/2016
Comm Tester	RTX 2012HS-RF	1239-6203	10/21/2014	10/20/2015
Dipole	SATIMO SID1900	SN46/11 DIP 1G900-187	11/14/2013	11/13/2016
Signal Generator	Agilent-E4438C	MY44260051	03/06/2015	03/05/2016
Spectrum Analyzer E4440	Agilent	US41421290	07/23/2015	07/22/2016
Network Analyzer	Rhode & Schwarz ZVL6	SN100132	03/06/2015	03/05/2016
Attenuator	Warison /WATT-6SR1211	N/A	N/A	N/A
Attenuator	Mini-circuits / VAT-10+	N/A	N/A	N/A
Amplifier	EM30180	SN060552	03/06/2015	03/05/2016
Directional Couple	Werlatone/ C6026-10	SN99482	07/29/2015	07/28/2016
Power Sensor	NRP-Z23	US38261498	03/06/2015	03/05/2016
Power Sensor	NRP-Z21	1137.6000.02	10/22/2014	10/21/2015
Power Viewer	R&S	V2.3.1.0	N/A	N/A

Note: Per KDB 865664Dipole SAR Validation, AGC Lab has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:
1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss is within 20% of calibrated measurement;
4. Impedance is within 5Ω of calibrated measurement.

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10. MEASUREMENT UNCERTAINTY

SATIMO Uncertainty Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram / 10 gram.									
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	7.0	N	1	1	1	6.98	6.98	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	1	1	1.16	1.16	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	1	1	2.33	2.33	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.87	2.87	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.03	0.03	∞
Response Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.70	1.70	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.16	1.16	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.71	1.71	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.91	2.91	∞
Test sample Related									
Test sample positioning	E.4.2.1	0.03	N	1	1	1	0.05	0.05	N-1
Device Holder Uncertainty	E.4.1.1	5.00	N	1	1	1	4.95	4.95	∞
Output power Variation - SAR drift measurement	6.6.2	0.65	R	$\sqrt{3}$	1	1	0.36	0.36	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.02	0.02	∞
Liquid conductivity deviation from target value	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.83	1.23	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.18	2.14	∞
Liquid permittivity - deviation from target value	E.3.2	0.03	R	$\sqrt{3}$	0.6	0.49	0.01	0.01	∞
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.06	4.95	M
Combined Standard Uncertainty			RSS				11.17	10.63	∞
Expanded Uncertainty (95% Confidence interval)			k				22.34	21.26	

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SATIMO Uncertainty

System uncertainty for 300 MHz to 3 GHz averaged over 1 gram / 10 gram.

Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	7.0	N	1	1	1	6.98	6.98	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	1	1	1.16	1.16	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	1	1	2.33	2.33	∞
Boundary Effects	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.87	2.87	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.03	0.03	∞
Response Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.70	1.70	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.16	1.16	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.71	1.71	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.91	2.91	∞
Dipole									
Dipole axis to liquid Distance	8,E.4.2	1.00	N	$\sqrt{3}$	1	1	0.55	0.55	N-1
Input power and SAR drift measurement	8,6.6.2	0.65	R	$\sqrt{3}$	1	1	0.36	0.36	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.02	0.02	∞
Liquid conductivity - deviation from target value	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.83	1.23	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.18	2.14	∞
Liquid permittivity - deviation from target value	E.3.2	0.03	R	$\sqrt{3}$	0.6	0.49	0.01	0.01	∞
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.06	4.95	M
Combined Standard Uncertainty			RSS				10.03	9.42	
Expanded Uncertainty (95% Confidence interval)			k				20.05	18.85	

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11. CONDUCTED POWER MEASUREMENT

DECT BAND

Mode	Frequency (MHz)	Maximum Peak Conducted Power (dBm)
DECT	1921.536	**19.2**
	1924.992	19.1
	1928.448	19.1

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12. TEST RESULTS

12.1. SAR Test Results Summary

12.1.1. Test position and configuration

Head SAR was performed with the device configured in the positions according to IEEE 1528-2013

12.1.2. Operation Mode

1. Per KDB 447498 D01 v05r02 ,for each exposure position, if the highest 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional.
2. Per KDB 865664 D01 v01r04,for each frequency band, if the measured SAR is ≥0.8W/Kg, testing for repeated SAR measurement is required , that the highest measured SAR is only to be tested. When the SAR results are near the limit, the following procedures are required for each device to verify these types of SAR measurement related variation concerns by repeating the highest measured SAR configuration in each frequency band.
   (1) When the original highest measured SAR is ≥0.8W/Kg, repeat that measurement once.
   (2) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is ＞1.20 or when the original or repeated measurement is ≥1.45 W/Kg.
   (3) Perform a third repeated measurement only if the original, first and second repeated measurement is ≥1.5 W/Kg and ratio of largest to smallest SAR for the original, first and second measurement is ≥ 1.20.
3. Maximum Scaling SAR in order to calculate the Maximum SAR values to test under the standard Peak Power, Calculation method is as follows:
   Maximum Scaling SAR =tested SAR (Max.) ×[maximum turn-up power (mw)/ maximum measurement output power(mw)]
4. DECT has a TDD/TDMA frame structure with a complete frame of 10ms duration with 24 time slots. And under these 24 time slots, the first 12 slots are allocated for the transmission from base station to handsets, and the other 12 slots are for the transmission from handsets to base station. During a call, this product will use one of 24 time slots to transmit under worst case, which gives a duty cycle of 1/24 (= 4.2%).

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12.1.3. Test Result

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 50.7					
Product: Wireless monitoring System with Safe & Sound Digital Audio Monitor - Parent Unit									
Test Model: DM251-102 PU									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±0.2db)**	**SAR (1g) (W/kg)**	**Max. Turn-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit W/kg**
Body Back With 0mm	voice	2	1924.992	--	**<0.0015 note(2)**	21	19.1	--	1.6
Body Front With 0mm	voice	2	1924.992	--	**<0.0015 note(2)**	21	19.1	--	1.6
Face up With 25mm	voice	2	1924.992	--	**<0.0015 note(2)**	21	19.1	--	1.6

Note:
(1).When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
(2) Due the duty cycle of DUT is very low, and the test value is lower than the maximum of SAR system identify value, there is no any SAR value ; The communication and output power are normal during test.

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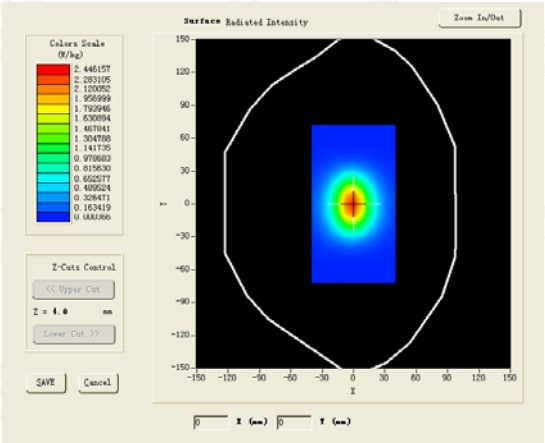
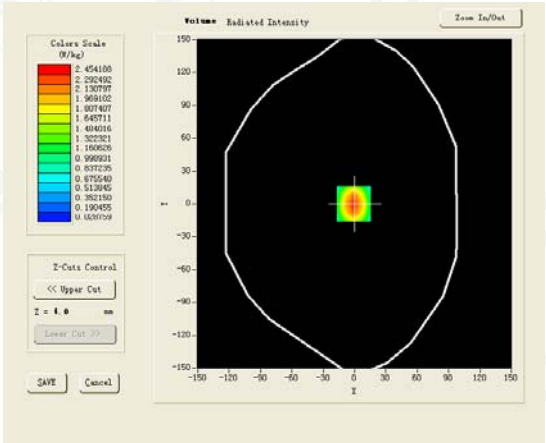
APPENDIX A. SAR SYSTEM CHECK DATA

Test Laboratory: AGC Lab **Date: Aug. 28,2015**
System Check Head 1900MHz
DUT: Dipole 1900 MHz; Type: SID 1900
Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Duty Cycle:1:1; Conv.F=4.31;
Frequency: 1900 MHz; Medium parameters used: f = 1900 MHz; σ=1.37 mho/m; εr =40.00; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):22.1, Liquid temperature (℃):22.0

SATIMO Configuration:
Probe: SSE5; Calibrated: 12/03/2014; Serial No.: SN 22/12 EP159
Sensor-Surface: 4mm (Mechanical Surface Detection)
Phantom: SAM twin phantom
Measurement SW: OpenSAR V4_02_01

Configuration/System Check 1900 Head/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 1900 Head/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=-1.00, Y=0.00

SAR 10g (W/Kg)	1.182322
SAR 1g (W/Kg)	2.325078

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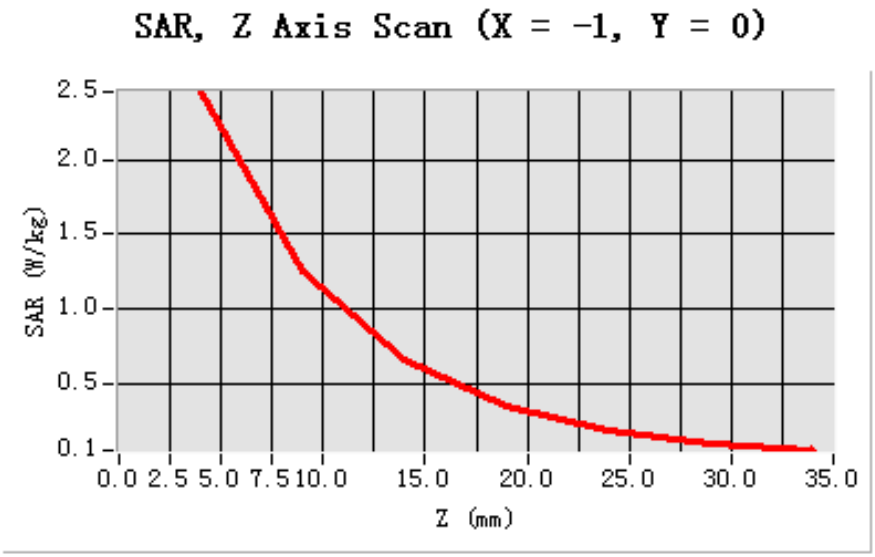
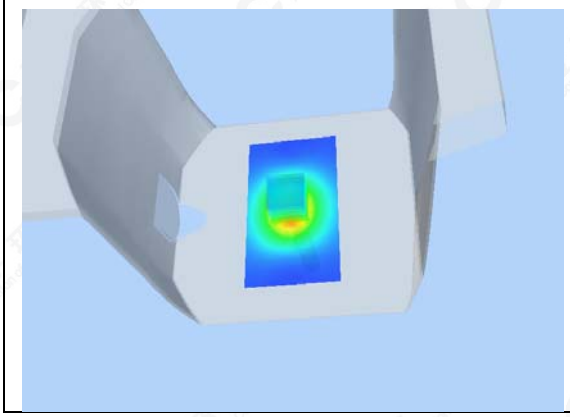
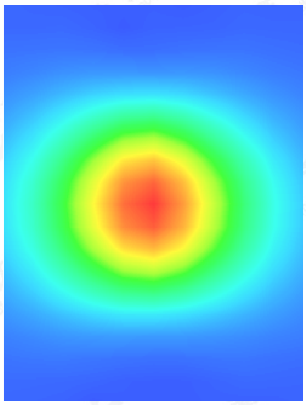
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.4557	1.2515	0.6600	0.3512	0.1896	0.1042



3D screen shot	Hot spot position
	

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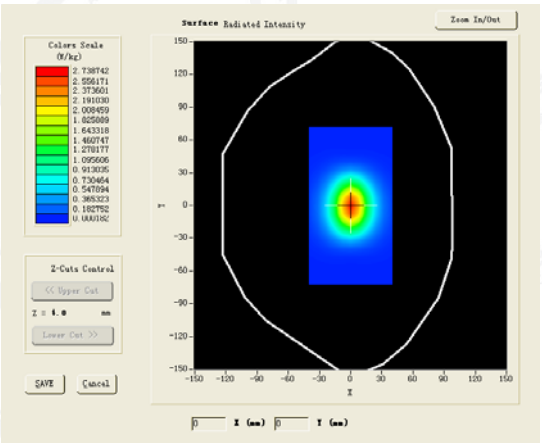
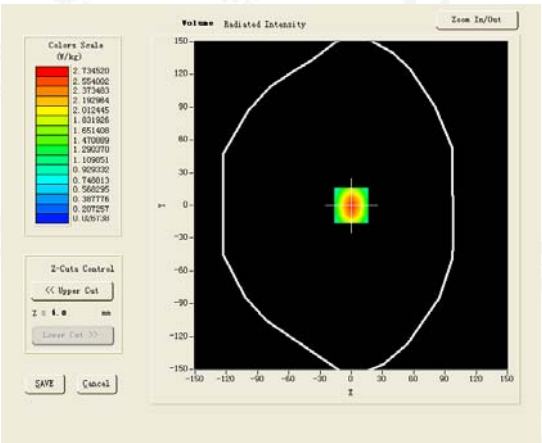
Test Laboratory: AGC Lab **Date: Aug. 28,2015**
System Check Body 1900MHz
DUT: Dipole 1900 MHz; Type: SID 1900
Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Duty Cycle:1:1; Conv.F=4.17
Frequency: 1900 MHz; Medium parameters used: f = 1900 MHz; σ=1.50 mho/m; εr =54.15; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):22.1, Liquid temperature (℃):21.8

SATIMO Configuration:
Probe: SSE5; Calibrated: 12/03/2014; Serial No.: SN 22/12 EP159
Sensor-Surface: 4mm (Mechanical Surface Detection)
Phantom: SAM twin phantom
Measurement SW: OpenSAR V4_02_01

Configuration/System Check 1900 Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 1900 Body/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	1.290035
SAR 1g (W/Kg)	2.587647

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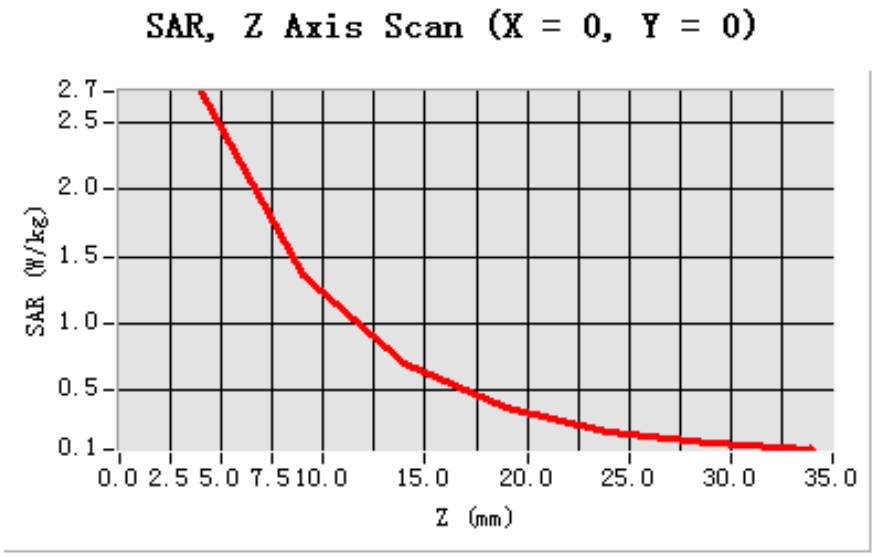
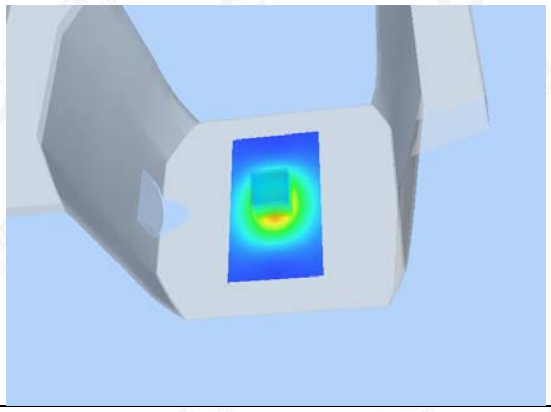
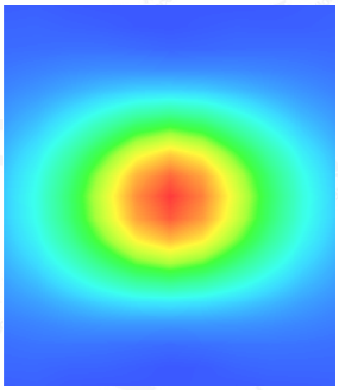
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.7337	1.3680	0.7076	0.3664	0.1928	0.1032



3D screen shot	Hot spot position
	

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APPENDIX B. SAR MEASUREMENT DATA

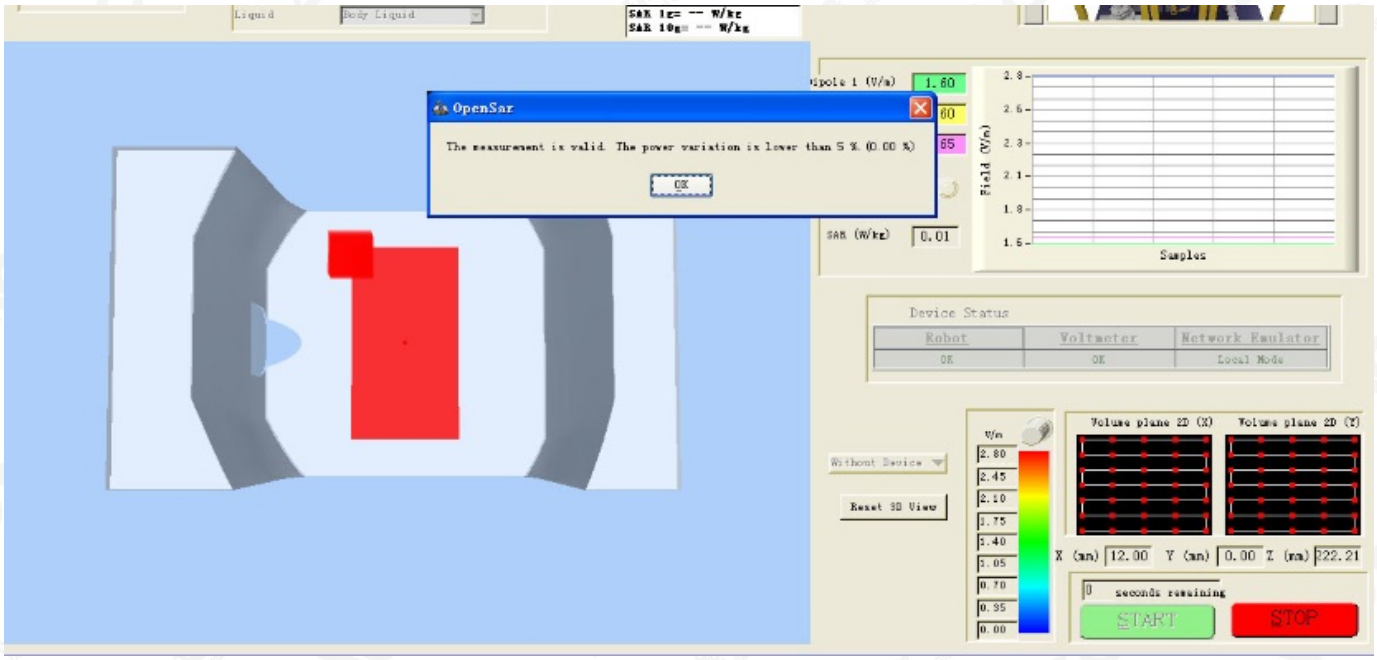
Test Laboratory: AGC Lab **Date: Aug. 28,2015**
DECT Mid-Body-Back
DUT: Wireless monitoring System with Safe & Sound Digital Audio Monitor - Parent Unit; Type: DM251-102 PU

Communication System: DECT; Communication System Band: 1900; Duty Cycle: 0.04, Conv.F=4.17; Frequency: 1924.992 MHz; Medium parameters used: f = 1900 MHz; σ=1.51 mho/m; εr =53.76; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1 Liquid temperature (℃): 21.8

SATIMO Configuration:
Probe: SSE5; Calibrated: 12/03/2014; Serial No.:SN 22/12 EP159
Sensor-Surface: 4mm (Mechanical Surface Detection)
Phantom: SAM twin phantom
Measurement SW: OpenSAR V4_02_01

Configuration/1900 Mid-Body-Back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/1900 Mid-Body-Back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm;

Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	DECT
Channels	Middle
Signal	Crest factor: 12.0



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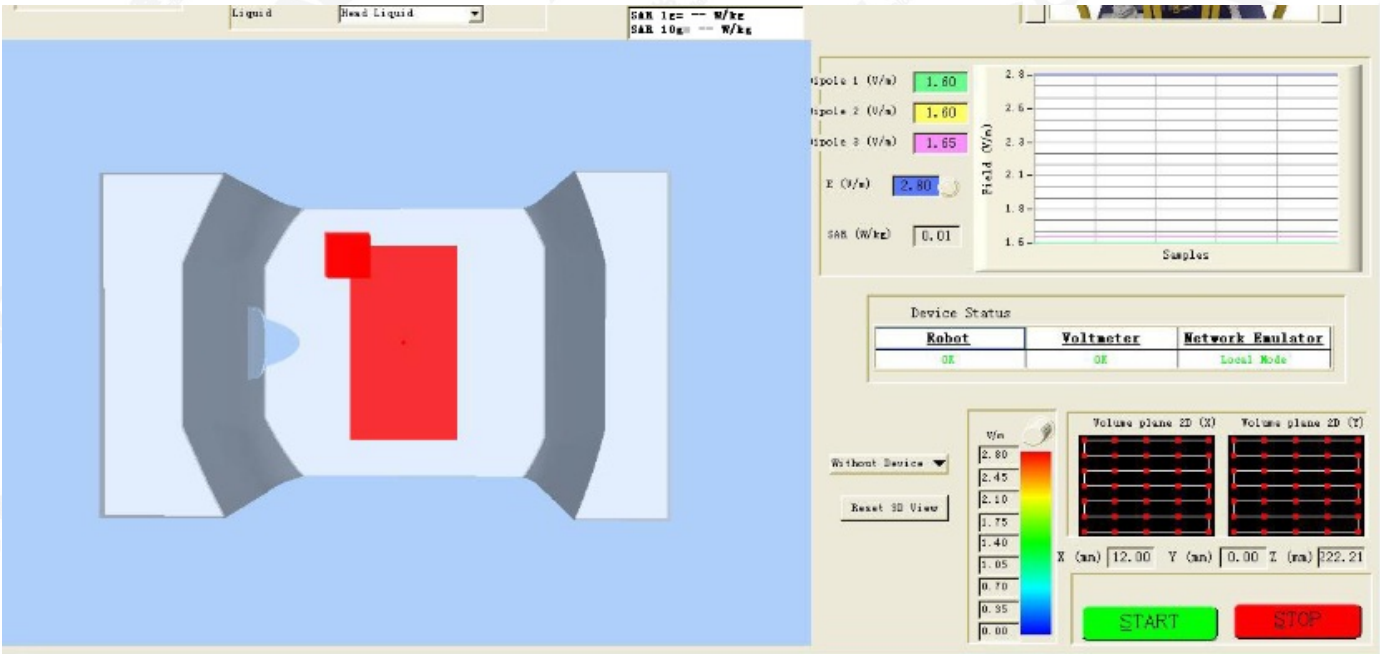
Test Laboratory: AGC Lab **Date: Aug. 28,2015**
DECT Mid-Body-Front
DUT: Wireless monitoring System with Safe & Sound Digital Audio Monitor - Parent Unit; Type: DM251-102 PU

Communication System: DECT; Communication System Band: 1900; Duty Cycle: 0.04, Conv.F=4.31; Frequency: 1924.992 MHz; Medium parameters used: f = 1900 MHz; σ=1.40 mho/m; εr =39.36; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1 Liquid temperature (℃): 21.8

SATIMO Configuration:
Probe: SSE5; Calibrated: 12/03/2014; Serial No.:SN 22/12 EP159
Sensor-Surface: 4mm (Mechanical Surface Detection)
Phantom: SAM twin phantom
Measurement SW: OpenSAR V4_02_01

Configuration/1900 Mid-Body- Front /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/1900 Mid-Body- Front /Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm;

Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Front
Band	DECT
Channels	Middle
Signal	Crest factor: 12.0



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APPENDIX C. TEST SETUP PHOTOGRAPHS &EUT PHOTOGRAPHS

Refer to Attached files.

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APPENDIX D. CALIBRATION DATA

Refer to Attached files.

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